

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application. The following listing provides the amended claims with deleted material crossed out and new material underlined to show the changes made.

### **Listing of Claims:**

1. (Currently Amended) A method of pre-computing costs of placing circuit modules in regions of circuit layouts, the method comprising:
  - a) defining a set of partitioning lines for partitioning the region into a plurality of sub-regions during a placement operation;
  - b) for each set of ~~potential~~ sub-regions, identifying a connection graph that traverses the set of ~~potential~~ sub-regions, wherein some of the connection graphs have edges that are at least partially diagonal;
  - c) identifying an attribute of each identified connection graph;
  - d) for each set of ~~potential~~ sub-regions, storing the attribute of the connection graph identified for the set, wherein said attribute is for use during a placement operation to compute costs of placing circuit modules in regions of circuit layouts.
2. (Currently Amended) The method of claim 1, wherein the connection graph for each set of ~~potential~~ sub-regions is the shortest graph that traverses the set of ~~potential~~ sub-regions.
3. (Original) The method of claim 2, wherein each connection graph is a Steiner tree.
4. (Currently Amended) The method of claim 1, wherein the attribute is the length,

the method further comprising:

for each connection graph, identifying a bend-value;

for each set of ~~potential~~ sub-regions, storing the bend value of the connection graph identified for the set.

5. (Currently Amended) The method of claim 4, wherein the bend-value of a graph specifies the number of diagonal bends of the graph.

6. (Original) The method of claim 1, wherein the partitioning lines form a partitioning grid.

7. (Original) The method of claim 1, wherein the partitioning lines are horizontal and vertical lines.

8. (Currently Amended) For a placer that partitions a region of a circuit layout into a plurality of sub-regions, a method of computing placement costs, the method comprising:

a) for a set of sub-regions, identifying a connection graph that connects the set of sub-regions, wherein the connection graph has at least one edge that is at least partially diagonal;

b) identifying a placement cost from an attribute of the connection graph;

c) storing the placement cost for the set of sub-regions, wherein said placement cost is for use during a placement operation to compute costs of placing circuit modules in regions of circuit layouts.

9. (Original) The method of claim 8, wherein the attribute is the length of the connection graph, and the placement cost equals the length of the connection graph.

10. (Original) The method of claim 9, wherein the length of the connection graph provides an estimate of the necessary wirelength for routing a net that has circuit elements in the

set of sub-regions.

11. (Original) The method of claim 8, wherein the attribute is a bend value.

12. (Currently Amended) The method of claim 11, wherein the bend-value of a graph specifies the number of diagonal bends of the graph.

13. (Original) The method of claim 8 further comprising:

for each set of sub-regions,

(i) identifying a connection graph that connects the set of sub-regions;

(ii) identifying a placement cost from an attribute of the connection graph;

(iii) storing the placement cost for the set of sub-regions;

wherein some connection graphs have at least one edge that is at least partially diagonal.

14. (Original) The method of claim 13, wherein the attributes are the lengths of the connection graphs, and the placement costs are the lengths of the connection graphs.

15. (Original) The method of claim 14, wherein each connection graph is a Steiner tree.